

THE FUTURE OF AEROLOGY

551.5 (048) By W. PEPPLER

[Abstract by H. C. Frankenfield from "Das Wetter," Heft 3, March, 1926]

(1) Aerology during the last 10 years has virtually been at a standstill.

(2) Aerological accomplishments of the last 20 years made possible the development of the Bjerknes theories, and their further progress depends entirely upon aerology.

(3) Especially necessary for the future of aerology is an intensive investigation of the upper half of the troposphere and the lower portion of the stratosphere. Little is known of the alto-cumulus and the cirrus. Knowledge of the strata above 4 k. m. is more important than that of the lower strata.

(4) The first step should be a complete reorganization of observational methods. Earlier observations are only partially comparable.

(5) A more accurate survey of the aerological conditions of the air strata up to about 1,000 meters is also necessary. In the present method of conducting captive-balloon ascents detailed registration is lost for the most part. A knowledge of the turbulence as well as of the structure of the strata near the surface can also be acquired.

(6) Special results are expected from the systematic coordination of radiation measurements with aerology. Radiation apparatus has not yet been successfully devised that will permit aerological technique to be placed in direct service for radiation investigation.

(7) Investigation of the influence of turbidity particles by the customary methods is already possible through the Wigand visibility measure.

(8) Measurements of incoming and outgoing radiation should be made.

(9) The airplane offers a new and very important factor for the future of aerology, as, on account of its mobility, it is superior in many respects to the old methods, especially for the study of optics, atmospheric electricity, turbulence, radiation, clouds, etc. An efficient airplane meteorograph has been devised.

(10) Old and new methods should be combined and considered together.

(11) We are still far removed from the ideal observatory, and only a small portion of the apparent problems can now be attacked. Present observatories are not well located, and they are too much occupied with practical problems. We have aerological observatories *but no research aerological institutes*. Research must form the fundamental basis, and it must not be strangled by the practical work. The idea that scientific progress is developed from practical work is incorrect. The path of meteorology and weather forecasting leads only over free scientific research.

A LIGHTNING STROKE FAR FROM THE THUNDER-STORM CLOUD

Mr. J. H. Armington sends us from Indianapolis the report printed below, which was sent to him by Prof. Z. A. McCaughan, of Bloomington, Ind. The stroke occurred about 1 p. m. on July 23, 1926, in Monroe County; it killed two children.

I drove to the place referred to and made personal inquiry of people who were within 100 yards of the place. The sun was shining, the nearest cloud seemed to the witnesses $2\frac{1}{2}$ or 3 miles north (toward Clear Creek and Bloomington). They had heard no thunder previous to this stroke and heard only two or three of distant thunder afterward. Their sky stayed clear for two hours afterwards. At the time of this stroke we were having frequent

strokes of lightning and thunder here at Bloomington and we had 0.23 inch of rain. Three miles southeast of Bloomington there was a small tornado that broke limbs of trees and carried away anything small that was loose. The lightning was severe. Witnesses near where the children were killed say the lightning traveled horizontally from north to south. It passed three buildings, missing them by about 100 feet, and struck this little house just above the top of the corner foundation post.

The striking of lightning, through clear sky, at points somewhat distant from the region immediately beneath the storm cloud, while relatively rare, occurs probably more frequently than is realized.

During a three-year residence in east-central Florida I observed the phenomenon at least three times. The typical local thunderstorm cloud of the Florida summer grows with great rapidity, and is usually an entity quite unconnected with storms of the same kind that may be developing elsewhere within the observer's field of view. Opportunities for watching the lightning strokes from individual clouds are therefore excellent.

It is my recollection that the distance along the ground between a vertical dropped from the edge of the cloud and the striking point of the bolt was of the order of the height of the cloud base above ground. How foreshortening affected this estimate is of course impossible to say. But it is probably true that the distances were never of the order of 2 to 3 miles, as in the extraordinary case described by Professor McCaughan. In one instance (and I think this was true of all these far flung bolts) the spark seemed to leave the cloud from a point at least halfway up from cloud base to summit, and in this one instance which I recall especially vividly it was about three quarters of the way.—B. M. V.

LITERATURE ON THE NORMAL DENSITIES OF GASES

Scientific Paper of the Bureau of Standards, No. 529, bears the title, "A Review of the Literature Relating to the Normal Densities of Gases," and was prepared by M. S. Blanchard and S. F. Pickering. The authors state in their abstract that—

* * * the attempt is made to choose the most reliable value for each gas. The number of sources of the gas in question, the methods used for its purification, the precautions observed in making the experimental measurements, the number of observations made, the agreement between observations of a set and the concordance between the results of the different observers have all been carefully considered in the selection of the final value. While many of the early determinations of historical interest have been included in general, only those which should be considered in selecting the final value have been critically reviewed.

THE SUMMER OF 1926 IN THE UNITED STATES

Summer is usually considered to cover the three months from June to August, inclusive. The records for these months of 1926 show about the usual run of variations in weather, with alternately warm and cool and rainy and dry in different sections and during different times in the season. For the summer, as a whole, the temperature was remarkably uniform, and was slightly above normal over much the greater portion of the country. The seasonal average was 1° to 3° below normal in most sections from the Ohio Valley and Middle Atlantic States northward, and 1° below at about half the stations in the Gulf area. In all other sections the temperature averaged from normal to as much as 6° above, the greatest plus departures being in the more western States.

Rainfall was deficient in most of the Northeast, the south Atlantic area, in nearly all of the Great Plains and North Central States, and also in most places in the far Southwest. Elsewhere the amounts were above normal.